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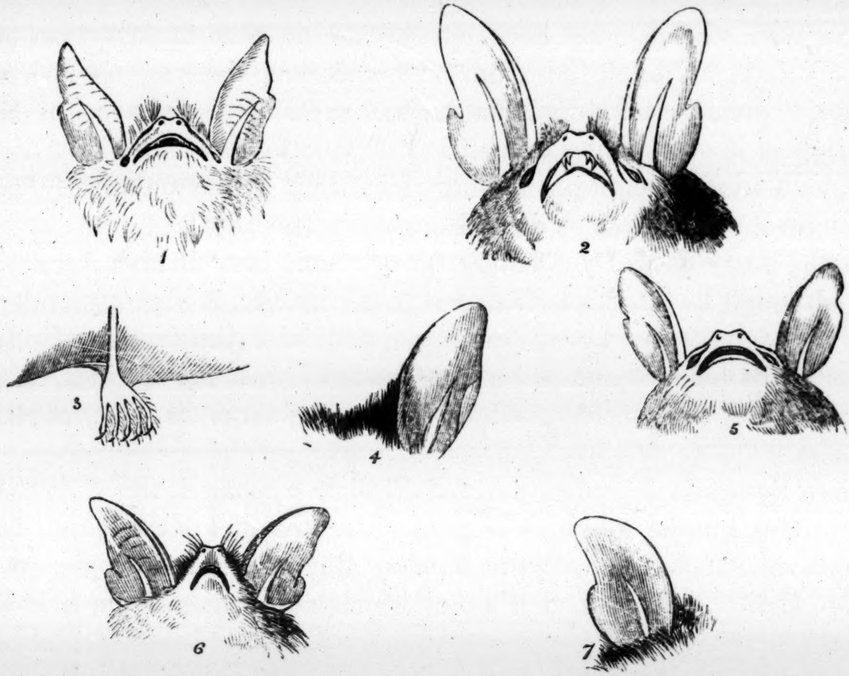
Critical Observations on the Notch-eared Bat.

By R. F. Tomes, Esq.



1. From Geoffroy. 2. From Cocks. 3 and 4. From De Selys Longchamps.
5. From Bonaparte 6. From one of my own specimens taken in Warwickshire.
7. From one of the specimens in the collection of M. Verreaux.

Several records having lately appeared of the occurrence of the notch-eared bat (*Vespertilio emarginatus*), a somewhat doubtful species, and having paid some attention to this order of Mammalia and collected some specimens of the so-called species, I am induced to collect together as much of its history as lies within my reach, hoping that it may prove useful to any collector who may have the fortune to obtain examples for investigation.

The first notice is by Geoffroy St. Hilaire, in the eighth volume of the 'Annales du Museum d'Histoire Naturelle,' accompanied by a figure of the entire animal, of the head and of the skull. The description is exceedingly meagre, and no dimensions are given, but the figure is stated to be of the size of Nature.

M. Geoffroy examined specimens from Abbeville, from the fortifi-

BRITISH MUSEUM

cations at Charlemont, and one specimen taken by Brongniart near Dover. The date of the time containing this account is 1806, and I am unaware of any other until 1820, when the 'Mammalogie' of Desmarest made its appearance, but without adding anything new to our knowledge of the species.

The next account we have appears to be that of Millet, in his 'Faune de la Maine et Loire,' in 1828, and, from the way in which he speaks, it must be supposed that he had examined specimens, as his description is much fuller than either of the two preceding him; indeed he distinctly mentions having met with it in the month of June "dans un des appartimens de la Baumette; très rare."

In the same year Dr. Fleming brought out his 'British Animals,' and, although he alludes to it as occurring in Fife, it is pretty evident from his remarks that he was unacquainted with the species, for he writes of its being "apt to be confounded" with M. murinus,—the largest European species, whilst V. emarginatus is one of the smallest.

The 'Synopsis Mammalium' of Fischer appeared the following year (1829), but he adds nothing to our store of knowledge on the subject, except that he refers to Kuhl's 'Beytrage zur Zoologie,' and to the MSS. of Leisler, neither of which authorities I am able to consult.

A good figure of what is supposed to be the V. emarginatus is given in the 'Fauna Italica' of the Prince of Canino, as also a figure of the skull, and both are exceedingly accurate representations of V. Nattereri, to which species the whole account is referred by MM. Keyserling and Blasius, in their work to be hereafter mentioned.

Two years after the date of the 'Fauna Italica,' the valuable monograph of the Vespertiliones by Temminck made its appearance (1835), but his figure is evidently a copy from that given in the first instance by Geoffroy,—a circumstance most remarkable, when we find that he says there are specimens in the Museums of Paris and the Low Countries.

The V. emarginatus of the 'British Vertebrate Animals,' by the Rev. Leonard Jenyns, which bears date the same year, is obviously the V. Daubentonii of other writers on Mammalia,—a fact he himself states to be the case in the 'Annals and Magazine of Natural History.'

In 1836 M. Hollandre published his 'Faune de la Moselle,' in which he mentions that the species was not rare in 1822-3, and that he took considerable numbers at that time in some vaults under a mill, where, he goes on to remark, it passes the winter.

After this comes the account given by Professor Bell, in his 'History of British Mammalia,' taken from the original notice by Geoffroy, with the observation that it is far from probable that it may prove to be identical with the V. Daubentonii; but a skull of the latter, compared with the figure of that part in the plate to the first notice of the V. emarginatus, does not at all bear out this opinion. The figures given by Professor Bell are good copies from Geoffroy.

Proceeding chronologically, I come to a very detailed description by the late Professor Macgillivray, in the volume of the 'Naturalists' Library' dedicated to the History of British Quadrupeds, from a specimen he had received from Winchester; but he appears, at the time of the publication of that work, not to have been aware that any other description had been given, except those of Geoffroy and Desmarest.

During the following year (1839) appeared the valuable 'Etudes de Micro-Mammalogie' of Baron de Selys Longchamps, at the end of which work is appended a methodical catalogue of all the European Mammalia, with their synonyms, distribution, &c.: in this he includes the V. emarginatus, and gives France, Germany and Italy as countries where it is found, but omits England.

In the year 1840 MM. Keyserling and Blasius published the first part of their work on European Vertebrata, 'Die Wirbeltheire Europas,' in which they refer the V. emarginatus of Geoffroy, Temminck and Macgillivray, to V. mystacinus, and the V. emarginatus of Bonaparte to V. Nattereri.

During this year the first volume of Wagner's continuation of Schreber's great work on Mammalia made its appearance, and in the classified index this species is included as a doubtful one, but is entirely omitted in the body of the work.

The next notice I find is in the 'Faune Belge' of Baron de Selys Longchamps, published in 1842. The author mentions having met with it in the quarries at Mæstrecht, where it passes the winter in the roof of the Château de Vogelsanck, near to Hassell, and that it has been found by M. Van Beneden at Lovain. De Selys appears to feel quite sure that it is a perfectly distinct species, for after speaking of the localities where it is found, he proceeds:—"It is singular that MM. Keyserling and Blasius confound it with V. mystacinus; it more nearly resembles V. Nattereri; but it is distinct from these species by its woolly fur, pale red on the back and extending markedly on the interfemoral membrane, by its ears being very much emarginated, its thick muzzle, &c. The colour of the emarginatus is nearly that of the Serotinus." At page 300 of the same work are some additions, among which the following occurs:—"Relatively to the Vesp. emarginatus, MM. Keyserling and Blasius have fallen into three remarkable errors: 1st, they consider that of Jenyns to be V. Daubentonii; 2nd, that of Geoffroy to be V. mystacinus; 3rd, they think that of Temminck is a copy, a little altered, of the figure given by Geoffroy, &c. I have proof that these assertions are incorrect. The emarginatus is as distinct from our other Vespertiliones as the Arvicola subterraneus is from our other Campagnols." At the end of the work a plate is given of the ears and feet of several European species of bats, amongst which are V. Nattereri, V. mystacinus and V. emarginatus; and unless the figures are exceedingly incorrect, the latter species must differ materially from the other two, but certainly bears the greatest resemblance to the first of these in the form of the ear, with the lobe folded inwards, as in that figure. But the author is evidently incorrect in some of these remarks, and MM. Keyserling and Blasius are right; for instance, the V. emarginatus of Jenyns is admitted by that gentleman himself to be referrible to some other species, probably V. Daubentonii; and again, a very slight inspection of Temminck's figure with that of Geoffroy will convince any one that the former is copied from the latter.

In 1848, having met with two specimens of bats that I was unable to refer to any of the known British species, except it were the description of the present one as described by Prof. Bell, I examined the account given by the first describer, and also that by Prof. Macgillivray already alluded to, and gave a short notice to the Zoological Society, which was published in the 'Proceedings' of that year, and again in the 'Annals and Magazine of Natural History' for August, the following year.

The next reference to this species that I met with is by Mr. Cocks, in the November number of the 'Naturalist' for 1851, accompanied by a short description and a figure of the head and ears, which, I may remark, differs from every other figure I have seen. Then comes the notice by Mr. Couch in the 'Zoologist;' and, finally, some observations by G. B. Bucton, Esq., F.L.S., to the Linnean Society, in December, 1853. In the latter paper the author treats the species as a variety of V. Daubentonii, and from his description the specimens he has met with cannot be identical with the species described by other writers on the subject,—*e. g.*, supposing the specimens examined by Mr. Bucton to closely resemble V. Daubentonii, in the latter the wing-membranes are only attached as far as to the ancle, whilst in the figure given by Baron de Selys Longchamps of the V. emarginatus they are attached as far as to the base of the toes, a character which has been considered by Mr. Gray of sufficient importance to be entitled to generic distinction.

Should this paper meet the eye of Mr. Bucton, will he allow me to suggest the possibility of his having met with the V. dasycnemus of continental writers—the V. lymnophilus of Temminck?

The species may be known from V. Daubentonii by being somewhat larger, grayer in colour, and with the feet still less engaged in the membranes. I am not aware that it has been recorded as having occurred in Great Britain, although it is common on many parts of the Continent.

Since writing the above it has occurred to me that at the time Prof. Fleming wrote his 'British Animals,' our common little bat V. pipistrellus was called V. murinus; and hence his remark, that the V. emarginatus might be confounded with it, is not so unlikely as at first appears,—but even in this case it must be a very ordinary observer who would confound the two, if they had specimens to examine. In the V. emarginatus the tragus is elongated and pointed; in the V. pipistrellus it is blunt. The first is a true Vespertilio; the latter is included in the Scotophilus of Leach.

It would be occupying space unnecessarily were I to give the descriptions of all these authors, particularly as some of them are merely copies of each other: I propose, therefore, giving in the first place a condensed description from the original one, with dimensions from the figure, and then from such others as appear to have been taken from specimens, and which appear to offer any remarkable points of difference.

GEOFFROY.—Ears oblong, of the length of the head, and notched at their outer edge. Tragus subulate. Above reddish gray, below ash-coloured. Fur bicoloured, the reddish gray occupying half the length of the hair. Tips of the hairs of the belly dirty white.

The figure of the skull is of exactly the same dimensions and proportions as the skull of V. mystacinus.

MILLET.—Ears oblong-oval, somewhat longer than the head, and notched at their external margin, with an external lobe reaching to about half their length, which is folded inwards in a state of repose. Tragus subulate, reaching to the notch of the ear. Feet hairy on their outer surface.

Above reddish gray, below paler; the hairs of the back long and soft to the touch, brown for their first half and pale reddish ash at their extremity.

TEMMINCK.—Form and size much as in V. mystacinus, with which it may be readily confounded.

Outer margin of the ears dilated into a distinct lobe, marked by a longitudinal crease or plait. Upper surface of the ears covered with scattered hairs, at the base very hairy. Above, all the parts of a rufous tint more or less bright, tinged with yellowish and brown. Hairs brown at their base, then yellowish and terminated with rufous. Below ash-coloured, slightly tinged with rufous, particularly the parts above the humerus. Membranes dirty brown.

M. Temminck commends the figures of Geoffroy and Bonaparte as being exact, but there is very little resemblance between them, more especially the crania.

MACGILLIVRAY.—Muzzle of moderate length and slightly emarginate between the nostrils. Ears as long as the head, widely separated, ovate-obtuse, but outwards, their inner margin convex, the outer with a semicircular lobe at the base, and a wide and deep sinus in their upper half. Viewed without reference to the basal lobe, they might be described as oblong, but otherwise they are broadly ovate and deeply emarginate. Tragus subulate, more than half the length of the ear. Membranes bare. Tail extending half a line beyond the interfemoral membrane. Cutaneous system dusky. Fur long, close, and very soft, inclining to silky. A series of long, soft, mystacial hairs on each side of the upper jaw, and a few project from the chin.

General colour very light reddish brown, inclining to gray on the upper parts, and grayish white tinged with brown on the lower; but the basal portion of the fur above and below is dark brown.

My own specimens before alluded to agree so closely with the above description that I refrain from giving any further account, except to remark that the wing-membranes spring from the base of the toes, as in V. mystacinus, which character is not mentioned by the Professor.

COCKS.—No. 1. Ears erect and deeply notched on the outer edge. Tragus long, styliform. Fur chestnut-brown on the back and sides, paler beneath.

No. 2. Ears notched on the outer edge, but not so deeply as in No. 1. Fur on the back and sides light reddish brown, abdominal and inguinal regions whitish.

BUCTON.—Ears somewhat narrower and more deeply notched (than in V. Daubentonii). The thumb stouter, and with reference to the size of the bat not so long. Fur more of an ash-gray, and the flying membranes and fur of the under side more cool in colour.

The last two columns in the following table of dimensions refer—the first to V. mystacinus and the other to V. Nattereri, from specimens in my own collection, and taken when fresh. The others, to descriptions of V. emarginatus by various authors.

	Geoffroy.	*Desmar.*	*Millet.*	*Temm.*	*Macgil.*	*Cocks.*	*Coeks.*	*Bucton.*		
Head and body	2 3	2 1¾	1 11½	1 11	1 11	2 4¼	1 9	3 7½	1 7½	1 11
Tail . .	1 3	1 4	1 4	1 3	1 4	0 10½	0 8½	1 5	1 5	1 5
Ears . .	0 6¾	....	0 3¼	....	0 5	....	....	....	0 6	0 7
Tragus . .	....	....	....	....	....	....	....	....	0 3½	0 5
Expanse .	10 6	9 7	9 7	10 2½	9 6	9 0	8 6	10 3	....	10 8
Fore arm .	....	....	....	1 6¼	1 5½	....	....	1 7½	1 3	1 5½
Humerus .	....	....	....	1 0	0 9½	....	....	....	....	0 11
Thumb . .	....	....	....	....	0 2	....	....	0 5	....	0 2¾
2nd Finger .	....	....	....	....	1 4½	....	....	....	....	....
3rd Finger .	....	....	....	....	2 3	....	....	....	....	2 7
4th Finger .	....	....	....	....	1 10½	....	....	....	....	....
5th Finger .	....	....	....	....	1 9½	....	....	....	....	....
Thigh . .	....	....	....	....	0 6	....	....	....	....	0 6¼
Leg . .	....	....	....	....	0 7½	....	....	....	....	0 7¼

The following descriptions are taken from two specimens of a species of Vespertilio which I received from Paris from M. Verreaux, labelled "V. emarginatus, Europe." They were along with specimens of other European species, such as V. murinus, V. Noctula, V. pipistrellus, V. Kuhlii, V. Wilsonii, &c.; and, from the peculiar manner in which all were preserved, I have no doubt that all were done by the same hand, and all correctly labelled. If such is the case, the specimens to which I allude cannot be referred to any species except V.

emarginatus, and they agree very closely with the remarks of Baron de Selys Longchamps, in his 'Faune Belge.'

Male, probably adult.—Muzzle somewhat elongated, but tumid; space around the eyes nearly naked; fur of the forehead very thick and extending to near the end of the nose; lips with a distinct moustache. Tragus very much attenuated near its extremity, reaching nearly to the notch in the margin of the ear, and bent outwards near the tip. Emargination of the ear not very deep, but clearly and well defined, about the middle of its length. Interfemoral membrane with about ten regular transverse lines, and the fur of the back extending on it for about half an inch, and down the legs to near the heel-bone. Wing-membranes taking their origin from the base of the toes. Upper parts pale bright cinnamon-brown, palest on the head, the hairs being brown at their base for a third of their length, then yellowish buff and tipped with pale red. Below of a rich cream-colour, darkest near the humerus, each hair being dusky brown at the base for half its length, the remainder cream-coloured. Fur exceedingly thick and soft. Membranes light reddish brown.

The second specimen is a female, and agrees exactly with the above in all respects, except colour; the hair of the upper part being dark at its base, tipped with umber-brown; beneath dark at the base, tipped with gray-brown. Membranes dark brown.

		No. 1.		No. 2.		
		in.	lin.	in.	lin.	
Head and body	about	2	9	2	8	about
Tail		1	3	1	2	
Head		0	8½	0	9	
Ears		0	6½	0	6½	
Tragus		0	4	0	3½	
Fore arm		1	5½	1	5	
From carpus to tip of wing		2	7	2	5½	
Thumb		0	2½	0	3	
Leg		0	8	0	9	
Foot		0	4	0	4	
Expanse	about	10	0	9	6	about.

From an inspection of these descriptions and figures, which I have given in as condensed a form as is consistent with anything like clearness, it cannot, I think, be doubted that some of them are exceedingly incorrect, or that more than one species is described. I incline to the latter opinion, and am doubtful whether the V. emarginatus of British naturalists must not be referred either to V. mystacinus, V. Nattereri or V. Daubentonii. My own specimens are most like the first of these, but differ remarkably in colour, and, as I once thought, in the form of the ear; but I have recently received some specimens of V. mystacinus, which were collected in Southern Russia, which have the same kind of emargination to the ear; and with regard to the colour, I have since had an opportunity of examining two females of Vespertilio Leisleri, containing each a fœtus, and these were of an unusual pale reddish colour. All the specimens of the so-called V. emarginatus I have captured have been females, containing a single fœtus. Prof. Macgillivray's description is so full that I have no hesitation in saying his specimen was of the same species as mine.

From the decided tone of the remarks made by Baron de Selys Longchamps, and from the figures he gives to elucidate the European species, we feel bound to believe that the species he speaks of is a perfectly good one; at any rate we cannot have a higher authority for such an opinion.

Before concluding I wish to call attention to what is really an emarginated ear, and what is in reality only an appearance of such. The ears of many species of bats are entire in their outline while in a fresh condition, as in the Nattereri, but there is a certain portion of the outer margin which is more membranous and less cartilaginous than the rest, and this in drying occasions an indentation or notch, which is evidently the case in the specimen represented by the Prince of Canino: this, by simply moistening the ear, may at once be removed, and the original form restored; but in the specimens I received from the Continent the notch is caused by the growth of a well-developed rounded lobe at the base of the ear, and such is evidently the case with the specimen from which the author of the 'Faune Belge' took his figure.

Should any of the readers of the 'Zoologist' meet with specimens of Vespertilionidæ which they feel doubt about identifying, I would respectfully solicit the opportunity of examining them, and would undertake their safe return to the owner.

Robert F. Tomes.

Welford, near Stratford-on-Avon,
June 14, 1854.

Remarks on a List of the Birds of West Cumberland.—Will your correspondent, Mr. Buchanan, allow me to make a few inquiries respecting some extraordinary statements in "A List of the Birds of West Cumberland," communicated by him to the 'Zoologist' (Zool. 4166)? I have delayed doing this till now, hoping that some one more competent than myself would have called attention to them sooner. I am sure I am only expressing a desire which must be felt by every ornithologist in asking Mr. Joseph Robson to favour the readers of the 'Zoologist' with some more information concerning the swallow-tailed kite which he states was shot in Eskdale, in the spring of 1853; this peculiarly American bird having, as far as I am aware, been taken only twice before on this side the Atlantic,—on one occasion fifty, and the other eighty, years ago (letting alone the fact that in the former case the bird, not having been killed, subsequently escaped from its captor, while in the latter naturalists have long lost sight of the identical specimen),—makes its occurrence here a third time very interesting, and I think justifies my asking for the following particulars:—1. A detailed description of the specimen said to have been killed in Cumberland. 2. The exact date of its occurrence. 3. The name and address of the person who shot it, and of its present possessor. 4. And some details of the circumstances under which it was obtained. The crested tit apparently is considered in the same light as the other tits; and the alpine accentor, with "Cold Fell, &c." as its localities, appears not to be thought much of in this fortunate county of Cumberland; as also, the little ring plover, spotted sandpiper, little and masked gull, which are rare enough in this part of the country, though they are stated to be "common" in Cumberland. However, should these birds, which are scarce in other parts of England, be "common" in Cumberland, surely Mr. J. Robson may expect a rush of ornithologists from all parts of the kingdom, each one endeavouring to obtain specimens of these birds for himself. —*Robert Birkbeck; Keswick, Norwich, June* 8, 1854.

Occurrence of the Hoopoe and Oriole near Blandford.—A fine specimen of the Hoopoe (*Upupa Epops*) was shot a short time back at Organ Ford, near Wareham, by the gamekeeper of J. Oldham, Esq., and is now being stuffed by Mr. Hart, of Christchurch. Also, in the garden at the rectory in this parish, a golden oriole (*Oriolus Galbula*), was, about three weeks back, seen constantly during more than a *week*, by the gardener, who described it to me as "about the size of a thrush, and of a bright yellow, with black on the sides." He also said, "that it was by no means shy, but hopped about on the newly dug ground, apparently picking up worms and insects." I have watched there several times since, but have not been able to catch a sight of it myself; still as the place is immediately contiguous to a large extent of orcharding, I have every hope that it may be peacefully undergoing the cares of a family, in one of the numerous apple trees apparently well suited for the purpose; for I do not imagine the male bird (which I conclude was the one the gardener observed) would stay so long a time as a week on the same spot, except accompanied by its mate, which the gardener would probably not have noticed, it being so very sober in plumage compared with the male.—*Octavius Pickard-Cambridge; Bloxworth House, Blandford, June* 8, 1854.

Occurrence of the Little Bittern and other Rare Birds in Surrey.—I beg to record a little bittern shot in the neighbourhood of Guildford, in Surrey, and now at Mr. Mansell's, Farnham, to be preserved. It is a female, in good condition, and with eggs in her when killed. I take this opportunity of enclosing a list of rare birds obtained in this neighbourhood within the last few years, and for so inland a locality it is by no means a poor bill of fare.

The Osprey. Milford House, Godalming.

Dartford Warbler. Farnham. In my own collection.

Bohemian Waxwing. Farnham. In my own collection.

Hoopoe. Frensham, near Farnham. In my own collection.

Dotterell. Farnham. In my own collection.

White Spoonbill. Frensham Pond. In my own collection.

Curlew. Frensham Pond. In my own collection.

Eared Grebe. Male, in summer plumage. Frensham Pond. In my own collection.

Gannet. An adult bird. Frensham Pond. In my own collection.

Little Bittern. Now added to the list.

This list is only of those that have come under my own observation. There may be many more to be recorded. I can add to these, as less rare:—

Hen Harrier. Male and female. In my own collection.

Long-eared owl. In my own collection.

Short-eared owl. In my own collection.

Great Gray Shrike.

Hooded Crow.

Ring Ouzel.

Gray Phalarope. In my own collection.

Sanderling. In my own collection.

Tufted Duck.

Scaup Duck.

Common Scoter.

I may add that a nest of woodcocks was hatched out last year close to my house. —*John W. G. Spicer; Willey House, Farnham, Surrey, June* 12, 1854.

Waterhen carrying her Young in her Feet.—A waterhen has built her nest in the branch of a fir tree which overhangs the river, a few feet above the water. She was seen yesterday to fly down with two of her young brood, one in each foot, from the nest.—*Samuel Gurney, jun.; Carshalton, June* 9, 1854.

Occurrence of the Bee-eater in Norfolk.—About the 3rd of this month a pair of these rare and beautiful birds were shot on the river between Norwich and Yarmouth. I had the pleasure of seeing them in the flesh, and for brilliancy of plumage I never saw finer specimens. Both birds were in good condition; and on dissecting the stomach of the female I found the remains of no less than five large insects of the Hymenopterous order, apparently the wild or humble bee species; the stomach of the male also contained similar débris, but less distinguishable. The ovary in the female appeared on examination not to contain any eggs in a perceptibly advanced stage, which may probably indicate that the bird had already deposited her quota of eggs for this season, whilst the thinness of feathers on the breast seemed suggestive of her having been sitting.—*H. Stevenson; Norwich, June* 16, 1844.

A List of Marine Animals obtained at Weymouth.

By P. H. Gosse, Esq.

As a large number of marine animals passed through my hands in the course of the summer of 1853, I have thought that an enumeration of such as are not common to almost every locality might be interesting to naturalists. Local Faunas are not without value, especially to a right understanding of the geographical distribution of animals, and the external conditions which regulate their presence or absence. But besides this, the following list will present some examples of animals of rarity, the record of whose capture is always valuable; and may afford hints to collectors where to find some species, which, though considered *scarce*, are rather *local*. I shall not deem it necessary to mention such animals as the cod and the mackerel, the crab and the lobster, which are taken in abundance for the market; nor shall I put down any species, though I may know of its occurrence in the locality, which has not come into my own possession.

Weymouth, and its immediate neighbourhood, was the scene of my researches. A few species from deep water were procured by the Weymouth trawlers, who extend their search into West Bay; hence I cannot be quite sure whether such specimens were obtained on the east or the west side of Portland. The overwhelming majority, however, were taken within a line extending from Lulworth to Portland Breakwater.

Fishes.

Trachinus vipera. Commonly hauled in seines, on sandy beaches.
Aspidophorus cataphractus. Not rare, around the quays.
Labrax lupus. Common in the harbour.
Cottus bubalis. Abundant.
Gasterosteus spinachia. Abundant around the quays.
„ semi-armatus, G. trachurus, and G. leiurus. Common in the backwater.
Atherina presbyter. Common in the harbour.
Mugil capito. Common in the harbour.
Blennius pholis. Abundant in tide-pools, on ledges.
„ ocellaris. Frequent off Preston, in autumn.
„ gattorugine. Common.
„ Yarrellii. One specimen in July.
„ Montagui. One specimen in July; dredged.
Muræenoides guttata. Common around the quays.

Gobius albus. Frequent in summer, off shore.

„ niger. Abundant in tide-pools.

„ unipunctatus. Abundant in the Fleet-water.

„ minutus. Dredged occasionally.

„ Ruthersparri. Common in the keer-drag.

Callionymus dracunculus. Common in the Bay.

Labrus bergylta. Abundant; brilliant specimens, and some of large size, occur frequently in various parts of the Bay.

„ Donovani. Quite common in the harbour.

„ mixtus. One small specimen.

Crenilabrus Cornubicus. Very abundant around the quays.

„ melops. Common, in summer and autumn.

„ rupestris. Common, in summer and autumn.

„ pusillus (?) One specimen.

Motella vulgaris. Not rare.

„ quinque-cirrata. Common.

„ glauca. This very rare and very minute fish (the mackerel midge) I obtained on the 8th of July, by dredging.

Platessa microcephala. Several specimens.

Solea pegusa. Two specimens, in July.

Monochirus linguatulus. Common.

Rhombus punctatus. A fine specimen of this very scarce little fish (Bloch's top-knot) was brought to me by a trawler, in August.

Lepidogaster bimaculatus. Frequently dredged in summer.

Ammodytes Tobianus and A. lancea. Commonly taken when the seine is hauled upon the sandy beaches.

Syngnathus acus, S. typhle, S. æquoreus, S. anguineus, S. ophidion, and S. lumbriciformis. The whole of the British pipe-fishes are quite common in Weymouth Bay, chiefly on the Zostera-beds, from low-water-mark to deep water. S. typhle and S. æquoreus are especially abundant.

Raia microcellata. Three specimens of this beautiful ray I took, together with the following species, with a small trawl, in shallow water, off Smallmouth Sands, at the end of June. Young specimens of R. clavata, beautifully ocellated, were also taken.

Raia marginata. See preceding note.

P. H. Gosse.

58, Huntingdon Street, Barnsbury Park.

(To be continued.)

Note on the Dorsal Ciliary Fibres of the Five-bearded Rockling.—Those readers of the 'Zoologist' whose attention has been turned to Ichthyology are doubtless aware that the five-bearded rockling is one of the commonest of those species of fish which frequent the rocky parts of our coast, and are to be obtained among the stones and sea-weeds in the pools of water left by the receding tide: they will also recollect that this fish is not only furnished with the five fleshy barbules around the mouth, from which it derives its name, but also with a similar barbule, of a somewhat stiffer texture, which is planted on the nape of the neck, between the roots of the pectoral fins. In the space intervening between this barbule (which is ordinarily kept in an erect position) and the dorsal fin, there is a furrow-like depression reaching from the barbule to the fin, all along the bottom of which is arranged a single close-set row of minute ciliary fibres, which are constantly to be seen in rapid vibratory motion, the movement extending throughout the whole of the row, and often continuing for a considerable period, especially (as far as my observation goes) when the fish is at rest after having been disturbed, though whether it only happens then I cannot say, but I think it never occurs when the fish is in motion. As I write from the sea coast, and have no books of reference by me, I am unable to say whether this peculiarity has been noticed by ichthyologists, but it appears to me to be a curious habit, and one which it would, if possible, be interesting to investigate and to explain. I therefore beg to call to the subject the attention of naturalists residing on the coast.—*J. H. Gurney; May* 22, 1854.

Abundance of the Larva of Lasiocampa Trifolii.—The larva of the above-named species has been exceedingly plentiful here this season, myself and two friends having taken nearly one hundred in the course of a few days' collecting. The cliffs adjoining Bovisand and Whitsand Bay were the most productive localities.—*W. H. Hayward; Devonport, Devon, June* 16, 1854.

List of Eupitheciæ, &c., reared from Larvæ.—I have lately bred the following Eupitheciæ :—

Eupithecia piperaria. From larvæ on Gentiana campestris, in August and September. Six.

„ fagicolaria. From ditto ditto. Thirteen.
„ innotaria. I believe from larva on hazel, in September. One.
„ minutaria. From larva on nettle, in September. One.
„ tenuiaria. From larva on wild thyme, in July. One.
„ rufifasciaria. From pupæ under oak, in August. Two.

I have also bred from larvæ taken last year :—

Geometra illustraria. From larva on hazel, in September. One.
Ephyra undularia. From larva on sallow, in October. One.
„ omicronaria. From larva on beech, in September. One.
Xerene adustaria. From larva on maple, in September. One.
Eurymene dolabraria. From larvæ on beech, in September. Three.
Boarmia consonaria. From larva on beech, in September. One.
Numeria pulveraria. From larvæ on hazel, August and September. Seventeen.
Abraxas ulmaria. From larvæ on wych elm, in September. Sixteen.

I was fortunate enough to find bred specimens of Notodonta ziczac and N. cucullina paired in my cage, a short time since. The females both laid eggs, which are already hatched, and the young larvæ feeding well.—*H. Harpur Crewe; 17, Cavendish Road, St. John's Wood, June 8, 1854.*

List of Syrphidæ taken near Putney.—Notwithstanding the paucity of communications respecting Diptera, in the 'Zoologist,' I am induced to hope that the following list of rather uncommon species of Syrphidæ, taken (with one exception) in this neighbourhood, during the late spring, may not be unacceptable to some of its readers. My attention has been directed almost exclusively to the Syrphidæ, or the list might perhaps be indefinitely extended.

Cheilosia flavipes. Beginning of April. Wimbledon Common.
Syrphus luniger. April 15 to May 20. River-bank; also at Weybridge.
Cheilosia albitarsis. May 9. Wimbledon Park, and elsewhere.
Syrphus grossulariæ. May 9. Wimbledon Park; also at Weybridge.
Ascia dispar. May 10. River-bank.
Syrphus tricinctus. May 12. Weybridge.
Doros citrofasciatus and ornatus. May 17. River-bank.
Cheilosia means and chlorus. May 23. Wimbledon Park.
Merodon clavipes. May 31. Of this rare insect I have at present but one specimen (fem.), taken in a market garden off cabbage-bloom.

I have also been fortunate enough to capture two species apparently new to the British list (a species of Syrphus and an Ascia), neither of which I have been able at present to determine: this may, perhaps, be the subject of a future communication.—*Fredk. W. Grant; Grove Villa, Putney, June 7, 1854.*

Notes on a Marine Aquarium. By GEORGE GUYON, Esq.

I SEND a few notes on a marine aquarium which I established at the commencement of the winter, as the subject seems to be exciting a good deal of interest at the present time. The experiment was conducted on a small scale, the "tank" being a confectioner's show-glass of about 1½ pint capacity, and two-thirds filled with sea-water. The first few weeks were a succession of failures, the animals dying and the water becoming offensive. This was, I believe, in a great measure owing to the glass lid being kept on, under the impression that an atmosphere of oxygen would thereby be maintained in contact with the water; for on substituting for the glass cover a piece of perforated zinc (to allow of the transmission of air but prevent the escape of the occupants), the condition of the aquarium greatly improved. For the last three or four months the water has never been changed nor the weed renewed, and several of the animals have continued in a flourishing state throughout the period.

The delicate bright green sea-weeds of the Ulva tribe seem to be the most suitable; those in the jar now appear as fresh as when introduced. The red kinds that I have tried, though making a beautiful appearance while fresh, soon become sickly and lose their colour. The plants now in use were placed in the vessel just as they were torn from the rock, without any portion of their solid support being removed with them. Into this receptacle were introduced small fish, Crustacea, Mollusca, and Zoophytes. The fish were three specimens of the smooth shan, tried at different times, but not one survived twenty-four hours, which rather surprised me, as on one occasion I succeeded in keeping a specimen alive for more than half a year in a tumbler, as recorded in a former number of the 'Zoologist.' Among the Crustacea were some sand-shrimps, but they too appeared out of their element, and always died in a few days, or fell a prey to their stronger comrades, the crabs, on whom confinement seems to have no other effect than to increase their naturally *crabbed* disposition, and foster a spirit of exclusiveness, which resents the intrusion of almost any living thing as an infringement of their rights and privileges. One specimen of the common kind has ruled in the vivarium with iron sway for the last three months, and woe to any of the weaker brethren that do not get speedily out of his way. I once introduced a full-grown specimen of the porcelain crab (*Porcellana platycheles*), thinking that the large forceps and remarkable pinching powers of this species would compensate for its inferior weight to this doughty champion, but the next morning found my old friend quietly discussing a claw of his luckless victim, whose severed limbs ornamented the bottom of the jar. On the 27th of February I found a marine worm, with numerous legs (I believe a Nereis), among the rocks, and placed it in the vessel; two days after I discovered several fragments of it in the jar, consisting of four or five segments each, which had been cut asunder by the trenchant nippers of the aforementioned crab. On fishing out one of these portions, I was surprised to see it exhibiting strong motion, protruding and retracting the legs with considerable vigour. I placed it under the microscope, the better to observe the movement, at 10 minutes after 1 o'clock, and at 25 minutes after 2, when I went out, the motion still continued, but it had ceased on my return, at ½ past 4. How long the segments had been severed, when first observed, it is impossible to say, but the movement was vigorous during the hour and a quarter that it was under observation. Among the Mollusca specimens, various common univalves were at different times introduced, and would flourish for awhile, but in the end were pretty sure to fall victims to his Crustaceous Majesty, against whose insinuating ways no operculum was proof; one prudent limpet, however, has contrived to baffle his attempts for two or three months, and still shares the vivarium with safety. Having learned wisdom, it may be by the fate of his companions, he never quits the glass wall of his abode, but glides slowly about with his shield to the enemy, or rests quietly, head downwards, displaying no sign of life but by the motion of the little cilia which fringe his shell. But one portion of the inhabitants of this "crystal palace" have not yet been mentioned, between whom and the crab a mutual compact of forbearance seems to have been entered into: these are the Actiniæ or sea-anemonies, four or five of which have dwelt peacefully in the midst of this scene of carnage, that is to say there has been peace maintained between them and the Crustacean warrior, but with the weaker inhabitants of the jar they too wage war. When dropping in some sand-shrimps, on one occasion, a large specimen, that fell near a smallish Actinia, was instantly seized and *engulphed* by this apparently feeble creature. The crab's size is evidently his protection, but *they* are plainly distasteful to him, and he interferes not with large or small, save it may be to wrest from one any article of food which it happens to be devouring. Some smaller zoophytes of the Flustra tribe are interesting, from their graceful forms and quick movements; and the plumose tufts of the little Spirorbis, so common on various sea-weeds, make a pretty appearance in the glass. A mark is made on the side of the jar, and whenever the surface of the water, from evaporation, falls below this point, *fresh water* is added to make up the deficiency, so that the *saltness* as well as the quantity of the contents remain the same.

I fancy the readers of the 'Zoologist' will not be sorry if I now come to a conclusion, having, I believe, said enough to show that a considerable amount of amusement may be derived from even a pint of sea-water.

George Guyon.

Ventnor, Isle of Wight,
June 6, 1854.

NOTICES OF NEW BOOKS.

'*The Zoology of the Voyage of H.M.S. Herald, under the command of Captain Henry Kellett, R.N., C.B., during the years* 1845—51.' Published under the authority of the Lords Commissioners of the Admiralty. *Fossil Mammals.* By Sir JOHN RICHARDSON, Knt., C.B., M.D., F.R.S. London: Reeve & Co. 1852. 100 pp. Royal 4to with 15 folio Plates, *price* 21*s.*; and 40 pp. Royal 4to with 8 folio Plates, *price* 10*s.* 6*d.*

We find no advertisement, preface, or explanatory introduction, to inform us of the plan or extent of this truly splendid work, neither do the portions before us bear on the wrapper or title-page any such useful subtitle as "Part" or "Number" or "Fasciculus 1 or 2," or any other indication whether they constitute a portion or the whole of the work intituled the Zoology of the Herald. This is the more remarkable in contrast with the lucid arrangement of the botanical account of the same voyage, in which we had a succinct programme of the whole before the first division was commenced. We may further remark, that we are disappointed in finding no account of the recent Fauna of the countries visited by the officers of the Herald: this is doubtless in reserve, and will in due time make its appearance. After stating these objections to the plan, or, speaking with greater precision, the want of plan of this handsome quarto, we are ready to bear our testimony to the sterling value of what is before us. Whatever Sir John Richardson undertakes, he accomplishes; whatever he does, he does well: no descriptions of fishes in our own or any language can vie with his in laborious and unmistakeable accuracy; and although this division of Vertebrates appears to have obtained his more especial attention, yet he is perfectly at home in many other branches of Natural History, and in none more so than in the osteology of Mammalia, whether recent or extinct. We quote entire the introductory observations on the Fossil-Bone Deposit in Eschscholtz Bay, believing that this valuable document will be acceptable to our readers, and knowing that an author is always pleased to find his own views pourtrayed in his own words.

"The science of Chemistry, as at present taught, justifies our belief that animal substances, when solidly frozen and kept steadily in a temperature below the freezing point, do not undergo putrefaction, and may be preserved without change for any conceivable length of time. The depth to which, in northern countries, the summer thaw penetrates, varies with the nature of the soil, but, except in purely sandy and very porous beds, it nowhere exceeds two feet in American or Siberian lands lying within the Arctic Circle. The influence of the sun's rays is not perceptible at this depth until towards the close of summer, which occurs at a varying period of from five to ten weeks from the time that the surface of the earth is denuded of snow by the spring thaw. During the rest of the year, even in the forest lands, though not so long there as in the open barren grounds, or *tundras*, the soil is firmly and continuously bound up in frost. The thickness of the permanently frozen substratum is more or less influenced by its mineral structure, but is primarily dependent on the mean annual temperature of the air acting antagonistically to the interior heat of the earth. Unless the mean heat of the year in any given locality falls short of the freezing-point, there exists no perennial frozen substratum at that place. It is not necessary that we should here endeavour to trace the isothermal line of 32° Fahr., as the reader may obtain a correct idea of its general course by consulting Baer's charts. It will suffice to say, that on the continent of America it passes some degrees to the southward of the 60th parallel of North latitude, and that while it undulates with the varying elevation of the interior, it has a general rise northwards in its course westerly.

" Where the permanently frozen subsoil exists it is a perfect ice-cellar, and preserves from destruction the bodies of animals completely inclosed in it. By its intervention, entire carcases of the extinct mammoth and tichorhine rhinoceros have been handed down in Arctic Siberia from the drift period to our times, and being exposed by landslips, have revealed most interesting glimpses of the fauna of that remote epoch. Conjecture fails in assigning a chronological date to the time when the drift and boulders were spread extensively over the northern hemisphere : the calculations that have been made of the ages occupied in the formation of subsequent alluvial deposits are founded on imperfect data ; and we merely judge from the absence of works of art and of human bones, that the drift era must have been antecedent to the appearance of man upon earth, or at least to his multiplication within the geographical limits of the drift. Whatever may be our speculations concerning the mode in which the carcases in question were inclosed in frozen gravel or mud, their preservation to present times in a fresh condition indicates that the climate was a rigorous one at the epoch of their entombment, and has continued so ever since. Moreover, as large carcases could not, without decomposition, be conveyed from a distance by water, it is fair to conclude that the animals lived in the districts in which they are found, or in their immediate neighbourhood, and not, as some have supposed, in warmer and more distant regions.

"It seems also to us to be impossible that ice could have been the vehicle by which whole bodies or complete skeletons could have been brought from warmer parallels and deposited in the vast cemeteries of polar Siberia or in Eschscholtz Bay, for the simple reason that ice is not the product of these warm countries. Nor does the difficulty seem less of explaining how such a group of pachyderms and ruminants could have been brought down by travelling glaciers from warmer southern valleys of mountain ranges no longer in existence, without admitting such extensive changes in the surface-level of the district as would confound all our ideas of the distribution of the drift, as we at present find it.

"It is easier to imagine that the animals whose osseous remains now engage our attention, ranged while living to the shores of an icy sea, and that by some sudden deluge, or vast wave or succession of waves, they were swept from their pasture-grounds. It is not necessary that we should here discuss the extent of this deluge, or inquire whether it covered simultaneously the North of Europe, Asia, and America; or operated by a succession of great waves or more local inundations. What more immediately concerns our subject is to know that in the drift containing marine shells of existing species, and boulders borne far away from their parent cliffs, we have evidence of diluvial action extending from the *ultima Thule* of the American polar sea to far southwards in the valley of the Mississippi.

"The identification of the fossil mammoth and rhinoceros of England and Europe with those of Siberia by the first of living comparative anatomists, might lead us to conclude that the same fauna inhabited the northern parts of the New and Old World; but I think that we shall find evidence in the bones of bovine animals brought from Eschscholtz Bay, that an American type of ruminants was perceptible even in that early age.

"At the present time the moose deer and mountain sheep inhabit districts of America suited to their habits up to the most northern limits of the continent; while the musk ox and reindeer go beyond its shores to distant islands; and the Arctic hare is a perennial resident of the most northern of these islands that have been visited, or up to the 76th parallel. Supposing the climate of North America, at a time just antecedent to the drift period, to have been similar or nearly so to that which now exists, the habits and ranges of the ferine animals at the two dates, though the species differ, may have had a close analogy. The mammoth and other beasts that browsed on the twigs of willows or large trees may have ranged as far North, at least in the summer, as the moose deer does now, or up to the 70th parallel; and lichenivorous or herbivorous ruminants may have extended their spring migrations still further North; — these journeys in quest of seclusion and more agreeable food being quite compatible with the co-existence of vast wandering herds of the same species in more southern lands, reaching even beyond the limits over which the drift has been traced, and where the final extinction of the entire races may be owing to causes operating in comparatively recent periods.

"The St. Petersburgh 'Transactions,' and other works, contain accounts of the circumstances attending the discovery of the entire carcases of a rhinoceros and of two mammoths in Arctic Siberia; and one cannot avoid regretting that they were beyond the reach of competent naturalists, who might, by examining the contents of the stomach, the feet, external coverings, and other important parts, have revealed to us much of the habits of these ancient animals, and of the nature of the country in which they lived. The inexhaustible deposits of organic remains in the Kotelnoi, or New Siberian Archipelago lying off the Sviatoi Noss, may yet disclose some equally perfect carcases; and their exploration by a scientific expedition is a project that promises a rich return for the labour and expense of such an undertaking.

"In Arctic America, such remains have been discovered in its north-eastern corner alone; and, as yet, bones, horns and hair have only been obtained, without any fresh muscular fibre: but all the collectors describe the soil from which they were dug, as exhaling a strong and disagreeable odour of decomposing animal matter, resembling that of a well-filled cemetery. In August, 1816, Kotzebue, Chamisso, and Eschscholtz discovered, in the bay which now bears the name of the last-mentioned naturalist, some remarkable cliffs, situated a short way southwards of the Arctic Circle, and abounding in the bones of mammoths, horses, oxen and deers. The cliffs were described by their discoverers as pure icebergs one hundred feet high, and covered with soil, on which the ordinary arctic vegetation flourished. These novel circumstances excited strongly the attention of the scientific world; and when Captain Beechey and his accomplished surgeon, Collie, ten years later, visited the same place, their best efforts were made to ascertain the true nature of the phenomenon. Dr. Buckland drew up an account of the fossil remains then procured, with illustrative plates, and Captain Beechey published a plan of the locality.

"This plan comprises a nearly square section of country, having a width and length of about fourteen miles. The Buckland River, where it bends to the northward to fall into Eschscholtz Bay, flanks the district on its inland or eastern border. From the mouth of this river the coast-line trends nearly due West to Eschscholtz Bluff, and forms the south side of that bay; the shore for one-half of the way, or about seven miles, between the bluff and Elephant Point, being composed of high icy cliffs, and for the remainder of the distance, or from Elephant Point to the river, the coast is low and slightly incurved. The west face of the land fronts Kotzebue Sound, and is formed of slaty gneiss rocks, which terminate on the North at Eschscholtz Bluff, and ten or twelve miles to the southward the rocky eminences, taking an inland direction, are flanked by low marshy ground. A ridge of hills runs parallel to the western shore at a distance of a mile and a quarter, and at their southern angle, where they bend inland, there stands still nearer the coast-line one of the loftiest bluffs, ascertained to be 640 feet high. From this corner the course of the range is south-easterly, the swampy country above mentioned running along its base. The banks of the Buckland are also represented as being high, if not hilly, and they inclose, in conjunction with the range, a sloping valley or basin, drained by numerous rivulets, and opening to the North on the low coast eastward of Elephant Point. At the western entrance of the Buckland there is a minor display of frozen mud-cliffs; similar deposits exist also on its eastern bank, as well as on the north shore of Eschscholtz Bay, likewise on various points of the coast between Beering's Strait and Point Barrow; but fossils have been detected only in Eschscholtz Bay, and on the banks of a few rivers that join Beering's Sea between it and Mount St. Elias.

"The following extracts from the Narrative of Captain Beechey's voyage contain a description of the cliffs by a skilful observer:—

"'We sailed up the (Eschscholtz) bay (28th July, 1826), which was extremely shallow, and landed at a deserted village on a low sandy point, where Kotzebue bivouacked when he visited the place, and to which I gave the name of Elephant Point, from the bones of that animal being found near it. The cliffs are from twenty to thirty feet in height, and rise inland to a rounded range of hills between four and five hundred feet high above the sea. In some places they present a perpendicular front to the northward, in others a slightly inclined surface, and are occasionally intersected by valleys and water-courses, generally overgrown with low bushes. Opposite each of these valleys there is a projecting flat piece of ground, consisting of the materials which have been washed down the ravine, where only good landing for boats is afforded. The soil of the cliffs is a bluish-coloured mud, for the most part covered with moss and long grass, full of deep furrows, generally filled with water or frozen snow. Mud in a frozen state forms the surface of the cliff in some parts; in others, the rock appears with the mud above it, or sometimes with a bank half way up it, as if the superstratum had slid down and accumulated against the cliff. By large rents near the edges of the mud-cliffs they appear to be breaking away, and contributing daily to diminish the depth of water in the bay.'—P. 257.

"'Such is the general conformation of this line of coast. That particular formation, which, when it was first discovered by Captain Kotzebue, excited so much curiosity, and bore so near a resemblance to an iceberg as to deceive himself and his officers, remains to be described. As we rowed along the shore, the shining surface of small portions of the cliffs attracted our attention and directed us where to search for this curious phenomenon, which we should otherwise have had difficulty in finding, notwithstanding its locality had been particularly described; for so large a portion of the ice-cliff has thawed since it was visited by Captain Kotzebue and his naturalists, that only a few insignificant patches of the frozen surface now remain. The largest of these, situated about a mile to the westward of Elephant Point, was particularly examined by Mr. Collie, who, in cutting through the ice in a horizontal direction, found that it formed only a casing of the cliff, which was composed of mud and gravel in a frozen state. On removing the earth above, it was also evident, by a decided line of separation between the ice and the cliff, that the Russians had been deceived by appearances. By cutting into the surface of the cliff, three feet from the edge, frozen earth, similar to that which formed the face of the cliff, was found at eleven inches' depth, and four yards further back the same substance occurred at twenty inches' depth. This glacial facing we afterwards noticed in several parts of the Sound, and it appears to be occasioned either by the snow being banked up against the cliff or collected in its hollows in the winter, and converted into ice in the summer by partial thawings and freezings, or by the constant flow of water during the summer over the edges of the cliffs, on which the sun's rays operate less forcibly than on other parts in consequence of their aspect. The streams thus become converted into ice, either in trickling down the still frozen surface of the cliffs, or after they reach the earth at their base, in which case the ice rises like a stalagmite, and in time reaches the surface.

But before this is accomplished, the upper soil, loosened by the thaw, is itself projected over the cliff, and falls in a heap below, whenever it is ultimately carried away by the tide.

"'(September, 1826). The cliffs in which the fossils (collected by Mr. Collie) appear to have been imbedded, are part of the range in which the ice formation was seen in July. During our absence of five weeks, we found that the edge of the cliff in one place had broken away four feet, and, in another, two feet and a half, and a further portion of it was on the eve of being precipitated on the beach. In some places where the icy shields had adhered, nothing now remained but frozen earth from the front of the cliff. By cutting those parts of the ice which were still attached, the mud in a frozen state presented itself as before, and confirmed our previous opinion of the nature of the cliff.'—P. 323.

"The above description of these remarkable cliffs has been quoted at length, as it is not only perfectly clear but concise. The opinions of Captain Beechey and his officers respecting the origin of the ice-cliffs are discussed at considerable length in Dr. Buckland's paper, printed as an Appendix to the Narrative of the Voyage. Mr. Collie describes the fossiliferous cliff as facing the North, and extending two miles and a half in a right line, with few interruptions, and as having a general height of about ninety feet. It is composed of clay, he says, and very fine quartzy and micaceous sand, assuming a grayish colour when dry. The land rises gradually behind the cliff to an additional height of one hundred feet, and is clothed with a black boggy soil, that nourishes brown and gray lichens, mosses, several Ericaceæ, Gramineæ, and various herbaceous plants, and is intersected by valleys pervaded by streams, and having their more protected declivities adorned with shrubs of willow and dwarf birches. 'The specimens taken out of the débris at the foot of the cliff (none were dug out of the cliff itself) were in a better state of preservation than those which had been alternately covered and left exposed by the flux and reflux of the tide, or imbedded in the mud and clay of the shoal. A very strong odour, like that of heated bones, was exhaled wherever the fossils abounded.'—P. 509.

"After an interval of twenty-four years, the recent voyage of the 'Herald' to this interesting spot has given a third opportunity of collecting fossil bones, and examining the structure of these now far-famed cliffs. Captain Kellett, Berthold Seemann, Esq., and Dr. Goodridge, with the works of Kotzebue and Beechey in their hands, and an earnest desire to ascertain which of the conflicting opinions enunciated by these officers was most consistent with the facts, came to the conclusion, after a rigid investigation of the cliffs, that Kotzebue was correct in considering them to be icebergs. I have been favoured with papers on the subject from each of the Herald's officers named above, and shall quote as fully from them as my limits allow, after premising a few general observations on the frozen cliffs of other parts of the Arctic coast that have come under my personal observation.

"At Cape Maitland, in Liverpool Bay, which forms the estuary of the Beghula River, and lies near the 70th parallel, there are precipitous cliffs from eighty to one hundred feet high, composed of layers of black clay or loam, inclosing many small water-worn pebbles and a few large boulders. With the exception of about eighteen inches of soil on the summit, which thaws as the summer advances, these cliffs present to the sea a constantly frozen wall, that crumbles annually under the action of the rays of a summer sun, but the fragments being carried away by the waves, and prevented from accumulating, the perpendicular form of the cliff is preserved. Elsewhere on the coast, cliffs equally vertical, but having a different exposure, were seen masked by a *talus* of snow, over which a coating of soil had been thrown by land-floods of melting snow pouring down from the inland slopes. The duration of these glacier-like snow-banks varies with circumstances. When the cliffs rise out of deep water, the ice on which the *talus* rests is broken up almost every summer, and the superincumbent mass, previously consolidated by the percolation and freezing of water, floats away in form of an iceberg. In other situations the snow-cliffs remain for a series of years, with occasional augmentations marked by corresponding dirt-bands, and disappear only towards the close of a cycle of warm summers. In valleys having a northern exposure, and sheltered by high hills from the sun's rays, the age of the snow may be very considerable; but it is proper to say that though aged glaciers of this description do exist on the shores of Spitzbergen and Greenland, they are of very rare occurrence indeed on the continental coast of America. The ice-cliffs of Eschscholtz Bay may have had an origin similar to that of the Greenland icebergs, and have been coated with soil by a single or by successive operations. I find it difficult, however, to account for the introduction of the fossil remains in such quantity, and can offer to the reader no conjecture on that point that is satisfactory even to myself. The excellent state of preservation of many of the bones, the recent decay of animal matter shown by existing odour, quantities of hair found in contact with a mammoth's skull, the occurrence of the outer sheaths of bison horns, and the finding of vertebræ of bovine animals lying in their proper order of sequence, render it probable that entire carcasses were there deposited, and that congelation followed close upon their entombment. A gradual improvement of climate in modern times would appear to be necessary to account for the decay of the cliffs now in progress, and the exposure of the bones. The shallowness of the water in Eschscholtz Bay, its narrowness, and its shelter from seaward pressure by Choris Peninsula and Chamisso Island, preclude the notion of icebergs coming with their cargoes from a distance having been found upon the beach at that place. Neither is it more likely that the bones and diluvial matters were deposited in the estuary of Buckland's river, and subsequently elevated by one of the earth-waves by which geologists solve many of their difficulties, for ice could not subsist long as a flooring to warmer water. In short, further observations are still needed to form the foundations of a plausible theory.

"Dr. Goodridge describes the several cliffs in succession with much detail, beginning with that next Elephant Point and proceeding to the westward. His paper, though interesting throughout, is too long for transcription entire, and I shall therefore merely abstract the most material parts. He commences by stating that the unusually mild season had produced great landslips, and exposed the structure of the several eminences forming the cliffs more extensively than in the year in which Captain Beechey visited them. Elephant Point, forming a high promontory in 1826, had now subsided to a mere hillock by the thawing of the icy substratum, as Kotzebue predicted would happen. A pit was dug to some depth in the loose loamy soil of this hillock, formed of the débris of the ruined cliff, at a point where the thighbone of a mammoth protruded above the surface, without any ice being found; but on the east of the hill next in succession, a wedge-shaped landslip had left a triangular chasm, whose floor, elevated twenty feet above the beach, was bounded by walls fifty feet high, of fine transparent ice; and its interior angle, reaching thirty feet backwards from the face of the cliff, exhibited an alluvium seemingly undisturbed since it was originally deposited, and consisting of regular layers of drift and peat, covered with thick beds of broken sticks and vegetable matter, over which lay a stratum of red river-gravel, then a bed of argillaceous earth, capped by dry friable mould and surface peat, nourishing its peculiar vegetation of coarse grass, moss, lichens, &c. The icy side-walls showed bands or layers considerably inclined, and testifying to their origin in drift snow; and the size of the sticks imbedded in the back walls of the chasm was greater than that of the stems of any of the bushes now growing in the neighbouring ravines. It is to be recollected, however, that a short way up Buckland River groves of spruce-fir are to be met with. A rivulet separates this hill from Elephant Point, and Dr. Goodridge found some of its slopes to be formed of semi-fluid mud, over which a man could not pass. On the *second* hill or cliff the depth of soil varied with the unevenness of the ice on which it rested, from twenty feet to less than four, the soil being everywhere dry. On dipping in one spot to the latter depth the surface of the ice was found to incline upwards in the direction of the hill, and the soil thrown out by the spade was so pulverulent that it was readily blown away by the wind. The *third* hill, which projected more boldly than the others, contained, as far as it was explored, neither fossils nor ice, but seemed to be entirely composed of thick beds of peat, *logs* of wood, sticks, and vegetable matter, lying generally, but not regularly, in a horizontal position, resting on dry clay, and a bed of river-gravel two feet thick. The *fourth* hill presented a higher and more extensive ice-cliff than any of the others, the ice having melted further back towards the centre of the hill, and forming an even wall upwards of eighty feet in height. The *fifth* cliff or marked projection, in proceeding to the eastward, appeared to have sunk bodily from the hill forming its back-ground, but had left behind it a few icy pillars and detached walls standing twenty feet above the surrounding level surface, and still covered with from seven to ten feet of soil. Water was flowing copiously from these walls of ice, and they were transparent, without admixture of earth, while the soil which capped them was dry and friable. In the slope of this ruined cliff most of the fossils obtained on this occasion were found, a few small fragments only having been gathered from the soft mud at its foot. Some were collected from the surface of the slope, others were dug out at places where the tips of the tusks protruded through the soil.

"A deep valley, through which a stream of water flows, divides the *sixth* hill from the preceding one. Portions of this hill had subsided from the melting of the icy foundation; but in one part a solitary block of ice, about twenty feet square, rose above the surface, retaining a thin layer of soil on its summit. From the vicinity of this block the hill rose abruptly on all sides; its declivity descended without break to the beach, and its soil, except in the section that had sunk, did not appear to have been ever disturbed. The beach at this place was not composed of muddy detritus, like that which skirted the bases of the other cliffs. A mammoth tusk, having been noticed protruding above the surface of this hill, was traced downwards by digging to the depth of eight feet; and the skull with a quantity of hair and wool were found lying on a thin bed of gravel, beneath which was solid transparent ice. Enveloping the bones there was a bed of still clay, several feet in thickness, and mixed with them a small quantity of sticks and vegetable matter. The superficial soil was loose and dry. A strong, pungent, unpleasant odour, like that of a newly opened grave in one of the crowded burial-places of London, was felt on digging out the bones, and the same kind of smell, in a less degree, was perceptible in various other places where the cliffs had fallen. From the same pit out of which the mammoth's skull was dug the bones of some smaller animals (a scapula, tibia, &c.) were taken, and were duly labelled at the time, but in the course of their transfer from one public department to another, after reaching London, the labels have been lost, together with the specimens of the buried wood, gravel, and other matters found associated with the bones. Dr. Goodridge says that this eminence was the last examined, the approach of night having prevented the party from exploring another hill lying between it and Eschscholtz Bluff: that hill, however, was covered with luxuriant vegetation, and no icy cliffs showed themselves.

" 'On Choris Peninsula,' says the same gentleman, 'frozen soil was found at the depth of four feet at the end of September, after an unusually warm summer; and a cask full of flour deposited by Captain Beechey in 1826, on Chamisso Island, was perfectly sound and fit for food when disinterred in 1848. It was disengaged with much difficulty from the frozen subsoil, and even the iron hoops of the cask were not rusted.' Dr. Goodridge appends to his paper some remarks on the annual waste of the ice-cliffs, and says that the bay is gradually filling up with the clay and soil which are precipitated into the sea on the melting of the ice on which they had reposed."

'*The Annals and Magazine of Natural History.*' No. 78, dated June, 1854; *price* 2*s*. 6*d*. London: Taylor & Francis, Red Lion Court, Fleet Street.

The contents of this number are as follows:—

'On some new Genera and Species of Fossil Fishes.' By Sir Philip Egerton, Bart., F.R.S., &c.

'Monograph of the British Graphideæ.' By the Rev. W. A. Leighton, B.A., F.B.S.E.

'Notes on the Ornithology of Ceylon, collected during an Eight Years' Residence in the Island.' By Edgar Leopold Layard, F.Z.S., C.M.E.S., &c.

'Description of a new Helix from Montpellier and a new Hydrobia from Nice, with Observations on some Varieties of the Extra Marine Shells of those Districts.' By John Paget, Esq.

'Notices of British Fungi.' By the Rev. M. J. Berkeley and C. E. Broome, Esq.

'A Reply to Prof. Sedgwick's Article published in the Annals and Magazine of Natural History for April, 1854.' By Prof. Milne-Edwards.

'A Synopsis of the Fissirostral Family Bucconidæ.' By Philip Lutley Sclater, M.A., F.Z.S.

'On the Anatomy of the Giraffe.' By T. Spencer Cobbold, M.D., Conservator of the Anatomical Museum, University of Edinburgh.'

'On the Growth of Sea-Weeds.' By P. H. Gosse, Esq., A.L.S.

Proceedings of Learned Societies:—Zoological—Royal Botanical of Edinburgh.

Miscellaneous:—Note on Bellia arenaria; by C. Spence Bate. Mr. Bowerbank and Prof. Sedgwick; by Prof. M'Coy. On the Habits of the Mungoos; by Lieut. Pegus. New locality for Viola lactea; by C. C. Lucas. On some Varieties of Land Shells from the South of France; by J. Paget. Schærer's Collection of Lichens.

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

June 5, 1854.—W. WILSON SAUNDERS, Esq., Vice-President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for June; by the Editor. The 'Athenæum' for May; by the Editor. The 'Literary Gazette' for May; by the Editor. The 'Journal of the Society of Arts' for May; by the Society. 'Entomologische Zeitung,' January to April; by the Entomological Society of Stettin. 'Revue et Magasin de Zoologie,' 1854, No. 4; by the Editor, M. Guérin-Méneville. 'Proceedings of the Royal Society, Vol. vi. No. 102, Vol. vii. No. 3; by the Society. 'Zeitung für Zoologie, Zootomie und Palæozologie,' heraus-gegeben von Dr. E. D'Alton and Dr. H. Burmeister; 1848, 2 Quartal. 'Bemerkungen über den allgemeinen Bau und die Geschlechtsuntershied bei den Arten der Gattung Scolia, *Fabr.*' von Dr. H. Burmeister; both presented by Dr. Burmeister. 'Proceedings of the Berwickshire Naturalists' Club' for 1853; by the Club. A box of British Micro-Lepidoptera; by Mr. Douglas. Two boxes of insects collected in Burmah, and presented by Captain Hamilton, M.E.S.: this collection contains several very rare and new insects, including a new Goliath beetle, which Mr. Westwood described under the name of Narycius Hamiltonii, and seven specimens of a wasp which M. de Saussure has just described from the single example hitherto seen in Europe, now in the British Museum: the Society passed a special vote of thanks for this valuable donation.

The Society's Excursion.

The Chairman announced, that in consequence of the opening of the Crystal Palace having been fixed for the 10th instant, the excursion of this Society, which was appointed for that day, would not take place; but the Council recommended an excursion to Darenth Wood on the 17th inst. instead.

Exhibitions.

The Secretary exhibited some very beautiful drawings, by Mrs. Hamilton, of the transformations of Indian insects, which that lady had forwarded for the use of the Society.

Mr. Smith exhibited several Hymenoptera, taken by Mr. Foxcroft, in Scotland, including Osmia parietina, of which he found a nest under a stone; a new species of Andrena; and two specimens of an Andrena which agree in every respect with some in the British Museum received from Nova Scotia, which he had placed doubtfully as dark varieties of A. Clerckella.

Mr. Janson exhibited some Coleoptera, sent from Scotland by Mr. Foxcroft, mentioning especially Elater (Diacanthus) impressus, E. lythropterus, *Germar.*, Pogonocherus fasciculatus, Sericosomus brunneus, S. fugax and Dictyopterus Aurora. He likewise exhibited a larva of Aplecta tincta with two excrescences, resembling Clavariæ, proceeding from the head, and which the captor states were green when the larva was alive.

Mr. Stevens exhibited a moth (Leucania?) found covered with a fungoid film; a fly, found impaled on a point of dry grass; two living larvæ of Notodonta Carmelita, part of the brood hatched from the eggs laid by the female exhibited at the last Meeting; and a specimen of the scarce Incurvaria tenuicornis, taken flying at Wickham Wood, in May.

Mr. Douglas exhibited Drilus flavescens, taken on flowers near Darenth Wood, June 1st; and seven species of Elachistæ reared from the larvæ, including the new one from Poa aquatica, for which he had proposed the name of E. Poæ.

Mr. Westwood exhibited some cocoons of the "Eria" silk forwarded from Malta by Dr. Templeton, with a request that he might be informed if any method was known by which the silk could be unwound from these cocoons, in which the silk was agglutinated into a solid mass, and hoping, if such a method was not known, some attention would be given to the subject, as, if this difficulty were overcome, there was no doubt this silk would become extensively used.

The Chairman said that very recently a gentleman, residing near Geneva, had asked his aid to procure some Indian silk cocoons, such as were exhibited by the East India Company at the Great Exhibition of 1851, in order to carry on some experiments of unwinding hard cocoons, in which he had hitherto been successful; and now that, by the extension of the cultivation of this valuable silk by its introduction into Malta (Zool. 4276), the supply would be increased, it was highly desirable that the difficulties of drawing off the threads should be conquered, and he trusted his correspondent would be successful with this kind also.

Mr. Boyd exhibited specimens of Elachista Treitschkiella, reared from the curious larvæ destitute of true legs, some of which were exhibited by Mr. Douglas at the Meeting of this Society in September last (Zool. 4066).

Goliath Beetles.

Mr. Westwood read a Memoir on Goliath beetles, describing several new species, and others of which one sex only was hitherto known.—*J. W. D.*

SOCIETY OF BRITISH ENTOMOLOGISTS.

June 5, 1854.—Mr. HARDING, President, in the chair.

The President exhibited a pair of Cloantha conspicillaris, taken at Darenth Wood. The female laid some eggs, which had hatched, and the young larvæ were now feeding. He also exhibited some specimens of Trochilium culiciforme, Pompelia Perfluella, and other Lepidoptera.

The President related a remarkable circumstance connected with Abrostola Urticæ: last July he took a number of the larvæ of this insect; about the 20th of last month the perfect insects began to make their apppearance, and from that time until the 3rd of the present month, being a succession of fourteen days, they have come out one each day: in no instance had there been a day missed, nor did two appear on the same day.

The President also exhibited some specimens of the new Elachista which he had discovered last year, about this time, feeding on Poa aquatica, and which he saw Mr. Douglas proposed to call Elachista Poæ. He, however, proposed to call it Elachista aquaticella, a name he considered much more in accordance with its habits.

Mr. Miller exhibited a specimen of Leptura sexguttata taken at Darenth Wood; also specimens of Ephyra trilinearia, Lithosia flava, Eupithecia abbreviata taken at Loughton, Pyrochroa coccinea, &c.

DUBLIN NATURAL HISTORY SOCIETY.

June 16, 1854.—JAMES R. DOMBRAIN, Esq., in the chair.

The following paper, by Mr. Andrews, was read:—

Habits of the Salmon.

"It had been my intention this evening to have submitted to the Society some peculiarities that I had observed in the spawning states of the Syngnathidæ, or pipe-fish family, more especially with reference to Syngnathus typhle—the deep-nosed pipe-fish, and to the straight-nosed pipe-fish (*S. ophidion*), and to have added a review of the several British species (all of which I have obtained on the South-west coast), detailing their several habits and seasons of spawning. From this, however, I have been diverted by several communications that have been made relative to the habits of the salmon, and as to the identity of the fish known as the parr or gravelling with the Salmo salar. This being a subject of such importance, not only in a scientific point, but in its practical application, that I again lay aside my paper upon the Syngnathidæ, with the hope that this will afford full discussion of interest for the evening. It may be in the recollection of the Members a paper of great interest given by Mr. Ffennell, Inspecting Commissioner of Fisheries, in the month of February, 1849, "On the Habits and Spawning States of the Salmon, and upon the Salmon Fisheries of this Country." In that paper Mr. Ffennell supported the views of Mr. Shaw, of Drumlanrig, relative to the first, and the parr state of the young salmon, and its remaining two years in the river before it assumed the smolt or migratory state; and though he admitted that the seasons and the condition of salmon were not the same in all rivers, yet he maintained that a uniform system of open and close season should be adopted in order to prevent the nefarious and injurious system that might probably result in salmon being exposed for sale in a public market taken from a close river while other rivers were open. This paper was in some measure an explanation with reference to an inquiry held on the fisheries of the Caragh and the Laune, in Kerry. My friend Mr. Williams, at that meeting of the Society, energetically disputed that the fish known generally as the parr or gravelling was the young of the salmon. He had made examinations of an extensive collection of that little fish, which he had obtained throughout the seasons from the rivers of Cork and of Wicklow, and he was not disposed to agree with Mr. Shaw, of Drumlanrig, that all gravellings were the young of the salmon. At the meetings of the months of April and of May last notices were again brought forward by Mr. Ffennell and by Mr. Williams, and which, differing in some views and principles, I thought it might lead to interesting, and I trust useful discussion, to submit some of the fish in the parr and in the smolt state, and to offer a few remarks. At the time of that discussion, in 1849, my attention had been chiefly directed to the sea-fisheries of the West coast; but during the seasons of 1848, 1849 and 1850, I had ample practical means of forming observations in the salmon fishery connected with the project I was engaged in. Determined to follow out that inquiry as time and circumstances permitted, my friend Mr. Williams accompanied me on the 23rd of May to Carlow, to visit the little river Greece. Former recollections and frequent fishing excursions satisfied me that the little fish known and described as the parr by Yarrell existed there in abundance. The rivers Greece and Ler, which stream through the borders of Carlow and Kildare, and empty

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FISHES.—A List of Marine Animals obtained at Weymouth, *P. H. Gosse, Esq.*, 4368. Note on the Dorsal Ciliary Fibres of the Five-bearded Rockling, *J. H. Gurney, Esq.*, 4370.

INSECTS.—Abundance of the Larva of Lasiocampa Trifolii, *W. H. Hayward, Esq.*, 4370. List of Eupitheciæ, &c., reared from Larvæ, *H. Harpur Crewe, Esq.*, 4370. List of Syrphidæ taken near Putney, *Fredk. W. Grant, Esq.*, 4371.

MARINE AQUARIUM.—Notes on a Marine Aquarium, *George Guyon, Esq.*, 4371.

NOTICES OF NEW BOOKS.—'The Zoology of the Voyage of H.M.S. Herald, under the command of Captain Henry Kellett, R.N., C.B., during the years 1845—51,' by Sir John Richardson, Knt., C.B., M.D., F.R.S., 4374. 'The Annals and Magazine of Natural History,' 4384.

PROCEEDINGS OF SOCIETIES.—Entomological, 4385. Society of British Entomologists, 4387. Dublin Natural History, 4388.

TO CORRESPONDENTS.

A valuable communication on the Pulsation of Mollusca, others from Mr. H. W. Bates and M. Julian Deby, and several minor articles, unavoidably stand over.

The correction to which Mr. Pickard-Cambridge alludes in his last note does not seem to have reached us: he will oblige us by repeating it.

The following books have been received for review:—

'The Microscope:' Beale. (Highley.)
'Shells and their Inhabitants:' Adams. (Van Voorst.) In parts, 2s. 6d. each.
'Aquarium:' Gosse. (Van Voorst.) 17s.
'Manual of Natural History:' Adams, &c. (Van Voorst.) 12s.

KIRBY'S 'BEES' AND MARSHAM'S 'COLEOPTERA.'

EDWARD NEWMAN has a copy of both the undermentioned Works to dispose of:—

1. MONOGRAPHIA APUM ANGLIÆ. By WILLIAM KIRBY, B.A., F.L.S., &c. 2 Vols. calf gilt, ROYAL. A presentation copy. Price £1. 15s.

⁂ Large paper copies of this Work are extremely rare.

2. ENTOMOLOGICA BRITANNICA. Tom. I. Coleoptera. By THOMAS MARSHAM, F.L.S., &c. Uncut, price 12s.

Edward Newman, 9, Devonshire Street, Bishopsgate.

BIRDS' EGGS.

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MR. J. C. STEVENS will Sell by Auction at his Great Room, 38, King Street, Covent Garden, on Thursday, 27th July, and following day, the fine and extensive CABINET of BRITISH, EUROPEAN and AMERICAN EGGS, the property of J. R. WISE, Esq., including those of the late Professor MACGILLIVRAY and M. AUDUBON, together forming the most important assemblage ever offered to public Sale. Catalogues are preparing.

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